

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL
N.C.	B-5201	1	8

STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

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STRUCTURE  
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 45299.1.1 (B-5201) F.A. PROJ. BRSTP-0099(8)  
COUNTY BEAUFORT  
PROJECT DESCRIPTION BRIDGE NO. 33 ON NC 99 OVER CANAL  
AT -L- STA. 16+02.50

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE BODDER OR CONTRACTOR SHALL BE RESPONSIBLE FOR THE INTERPRETATION OF THE DATA AND THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORINGHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNPLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS ARE NOT NECESSARILY REPRESENTATIVE OF THE CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BODDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS AND THE SUBSURFACE INVESTIGATION ARE BASED ON THE DATA AND INFORMATION PROVIDED BY THE BODDER OR CONTRACTOR. THE BODDER OR CONTRACTOR SHALL BE RESPONSIBLE FOR THE INTERPRETATION OF THE DATA AND THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BORINGHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNPLACED TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS ARE NOT NECESSARILY REPRESENTATIVE OF THE CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

PERSONNEL

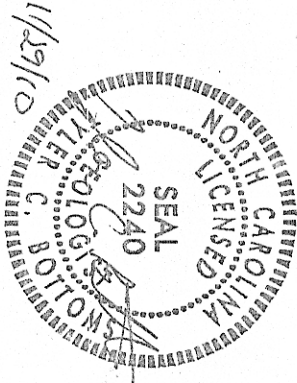
FLORENCE & HUTCHINSON, INC.

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE NOVEMBER 2010



PROJECT: 45299.1.1

ID: B-5201

DRAWN BY: C.P. TURNER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



N

NC GRID  
NAD 83/NSRS 2007

15

WOODS

NC HWY 99

-L-

TO SR 1625

CULTIVATED FIELD

EB1-A

EB1 BENT LINE

EB2-A

EB2 BENT LINE

CANAL

14' SOIL

16' SOIL

16' SOIL

CULTIVATED FIELD

WOODS

SKREW = 90°

PROJECT REFERENCE NO.	SHEET
B-5201	3 OF 8
SITE PLAN	
0 30 60 FEET	

# PROFILE THROUGH BORINGS PROJECTED ALONG -L-

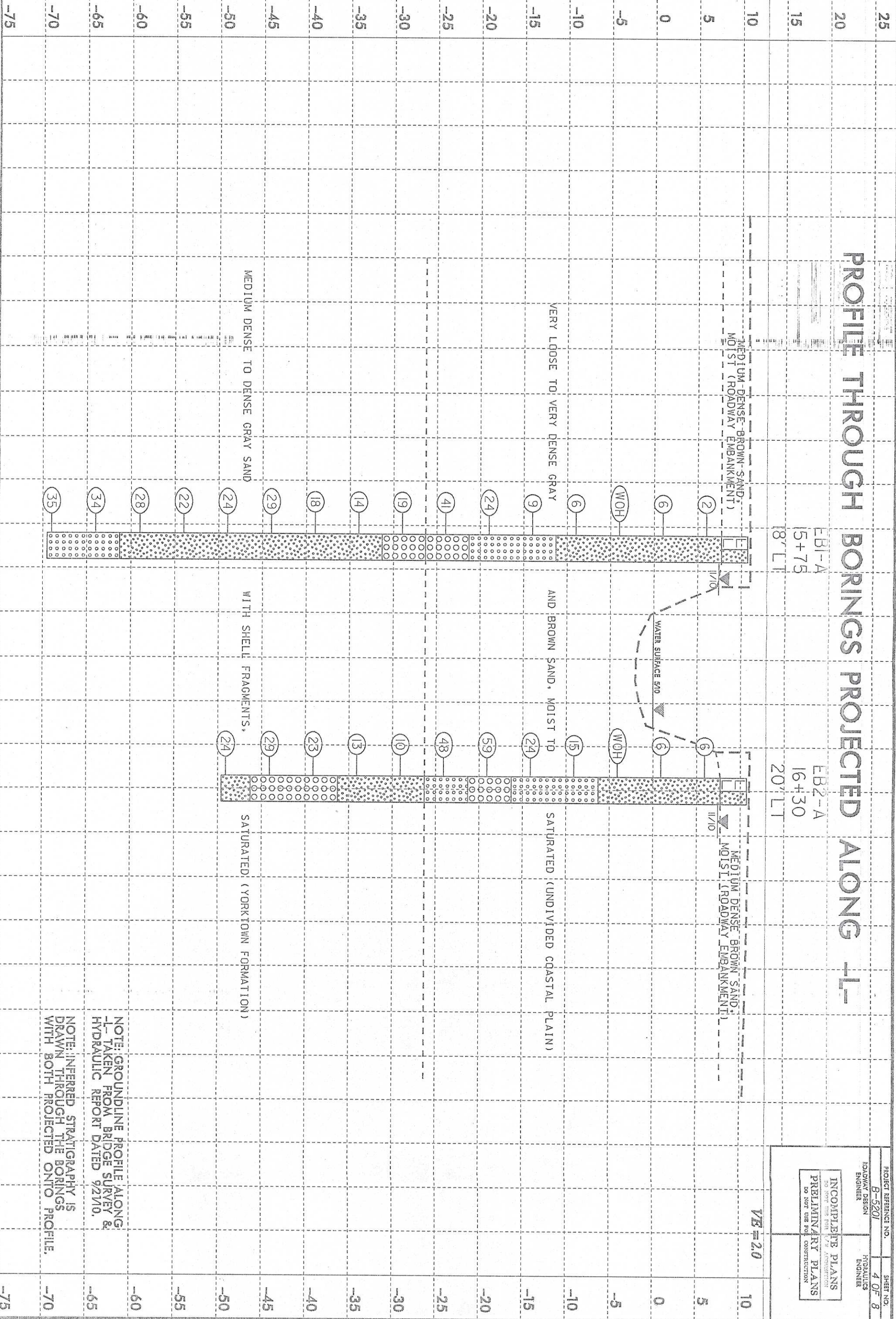
EB1-A  
15+75  
18' LT

EB2-A  
16+30  
20' LT

VE = 2.0

INCOMPLETE PLANS  
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

PROJECT REFERENCE NO. B-5201  
ROADWAY DESIGN ENGINEER  
SHEET NO. 4 OF 8  
HYDRAULICS ENGINEER



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM BRIDGE SURVEY & HYDRAULIC REPORT DATED 9/2/10.

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.



SHEET 5 OF 8

PROJECT NO. 45299.1.1		ID. B-5201	COUNTY BEAUFORT	GEOLOGIST FLORENCE & HUTCHESON
SITE DESCRIPTION BRIDGE NO. 33 ON I- (NC 99) OVER A CANAL				
BORING NO. EB1-A	STATION 15+75	OFFSET 18 ft LT	ALIGNMENT -L-	GROUND WTR (ft)
COLLAR ELEV. 10.7 ft	TOTAL DEPTH 80.2 ft	NORTHING 689,669	EASTING 2,702,063	0 HR. N/A
DRILL RIG/HAMMER EFF./DATE F&H0404 CME-45C 92% 05/19/2009			DRILL METHOD Mud Rotary	24 HR. 3.3
DRILLER GOWER, SONNY			HAMMER TYPE Automatic	
ELEV (ft)	DEPTH (ft)	BLOW COUNT	START DATE 11/06/10	COMP. DATE 11/06/10
		0.5ft 0.5ft 0.5ft		
15				
10				
5	7.0	3.7	5	1
0	2.0	8.7	2	3
-5	-3.0	13.7	WOH	WOH
-10	-8.0	18.7	2	3
-15	-13.0	23.7	3	2
-20	-18.0	28.7	8	10
-25	-23.0	33.7	14	17
-30	-28.0	38.7	5	10
-35	-33.0	43.7	9	8
-40	-38.0	48.7	9	8
-45	-43.0	53.7	14	15
-50	-48.0	58.7	10	12
-55	-53.0	63.7	10	10
-60	-58.0	68.7	10	11
-65	-63.0	73.7	14	17

GROUND SURFACE 10.7

ROADWAY EMBANKMENT 7.2

UNDIVIDED COASTAL PLAIN 3.0

GRAY AND BROWN SAND, MOIST TO SATURATED

GRAY SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION) 26.3

COASTAL PLAIN 37.0

GRAY SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION) 31.3

GRAY SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION) 42.0

GRAY SAND WITH SHELL FRAGMENTS, SATURATED (YORKTOWN FORMATION) 41.3

PROJECT NO. 46299.1.1		ID. B-6201		COUNTY BEAUFORT		GEOLOGIST FLORENCE & HUTCHESON	
SITE DESCRIPTION BRIDGE NO. 33 ON L- (NC 99) OVER A CANAL							
BORING NO. EB-1-A		STATION 15+75		OFFSET 18 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 10.7 ft		TOTAL DEPTH 80.2 ft		NORTHING 689,669		EASTING 2,702,063	
DRILL RIG/HAMMER EFF/DATE FAH0404 CME-45C 92% 05/19/2009				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER GOWER, SONNY		START DATE 11/06/10		COMP. DATE 11/06/10		SURFACE WATER DEPTH N/A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOWS PER FOOT			SAMP. NO.	SOIL AND ROCK DESCRIPTION
			0.5ft	0.5ft	0.5ft		

PROJECT NO. 45299.1.1		ID. B-5201		COUNTY BEAUFORT		GEOLOGIST FLORENCE & HUTCHESON			
SITE DESCRIPTION BRIDGE NO. 33 ON -L- (NC 99) OVER A CANAL						GROUND WTR (ft)			
BORING NO. EB2-A		STATION 16+30		OFFSET 20 ft LT		0 HR. N/A			
COLLAR ELEV. 10.7 ft		TOTAL DEPTH 60.3 ft		NORTHING 689,678		EASTING 2,702,117			
DRILL RIG/HAMMER EFF/DATE F&H0404 CME-45C 92% 05/19/2009		DRILL METHOD Automatic		Mud Rotary		HAMMER TYPE Automatic			
DRILLER GOWER, SONNY		START DATE 11/06/10		COMP. DATE 11/06/10		SURFACE WATER DEPTH N/A			
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT	BLOWS PER FOOT	SAMP. NO.	MOI	ELEV (ft)	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
15									
10									
5	6.9	3.8	1	2	4	SS-1		GROUND SURFACE ROADWAY EMBANKMENT BROWN SAND, MOIST UNDIVIDED COASTAL PLAIN GRAY AND BROWN SAND, MOIST TO SATURATED	3.0
0	1.9	8.8	2	3	3	SS-2			
-5	-3.1	13.8	WOH	WOH	WOH	SS-3			
-10	-8.1	18.8	4	7	8	SS-4			17.0
-15	-13.1	23.8	10	10	14				
-20	-18.1	28.8	18	27	32	SS-5			27.0
-25	-23.1	33.8	16	22	26				32.0
-30	-28.1	38.8	6	4	6	SS-6			
-35	-33.1	43.8	7	7	6				
-40	-38.1	48.8	6	10	13	SS-7			47.0
-45	-43.1	53.8	12	14	15				57.0
-50	-48.1	58.8	10	12	12	SS-8			60.3
-55									
-60									
-65									

BRIDGE NO.33 ON NC 99 OVER CANAL AT -L- STA.16+02.50

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-9	18 LT	15+75	3.7-5.2	A-2-4(0)	27	NP	10.9	70.0	9.1	10.1	100	99	21	-	-
SS-10	18 LT	15+75	8.7-10.2	A-2-4(0)	21	NP	8.3	78.9	4.7	8.1	100	98	15	-	-
SS-11	18 LT	15+75	13.7-15.2	A-2-4(0)	21	NP	23.6	56.8	5.5	14.1	96	86	21	-	-
SS-12	18 LT	15+75	23.7-25.2	A-3(0)	20	NP	62.5	29.4	5.0	3.0	90	60	10	-	-
SS-13	18 LT	15+75	33.7-35.2	A-1-b(0)	19	NP	83.1	13.9	2.0	1.0	95	32	4	-	-
SS-14	18 LT	15+75	38.7-40.2	A-1-b(0)	24	NP	56.6	24.4	10.0	9.1	87	50	18	-	-
SS-15	18 LT	15+75	48.7-50.2	A-2-4(0)	27	4	56.6	20.0	11.4	12.1	92	54	25	-	-
SS-16	18 LT	15+75	58.7-60.2	A-2-4(0)	25	NP	55.6	32.2	5.1	7.1	97	72	14	-	-
SS-17	18 LT	15+75	68.7-70.2	A-2-4(0)	22	NP	53.3	32.8	6.9	7.1	89	64	14	-	-
SS-18	18 LT	15+75	73.7-75.2	A-3(0)	24	NP	25.1	67.0	4.8	3.0	100	93	10	-	-

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT			% PASSING (SIEVES)			% MOISTURE	% ORGANIC	
							C.SAND	F.SAND	SILT	CLAY	10	40			200
SS-1	20 LT	16+30	3.8-5.3	A-2-4(0)	23	NP	10.0	68.4	8.5	13.1	100	99	23	-	-
SS-2	20 LT	16+30	8.8-10.3	A-2-4(0)	24	NP	10.1	79.3	4.5	6.0	100	98	13	-	-
SS-3	20 LT	16+30	13.8-15.3	A-2-4(0)	22	NP	23.5	57.8	6.7	12.1	97	87	21	-	-
SS-4	20 LT	16+30	18.8-20.3	A-3(0)	20	NP	77.5	16.6	1.8	4.0	97	54	6	-	-
SS-5	20 LT	16+30	28.8-30.3	A-1-b(0)	19	NP	91.0	6.5	1.5	1.0	95	22	3	-	-
SS-6	20 LT	16+30	38.8-40.3	A-2-4(0)	28	6	47.1	29.4	9.4	14.1	83	54	21	-	-
SS-7	20 LT	16+30	48.8-50.3	A-1-b(0)	27	4	60.3	18.3	10.3	11.1	82	46	20	-	-
SS-8	20 LT	16+30	58.8-60.3	A-2-4(0)	26	NP	54.0	32.9	7.1	6.0	96	71	15	-	-



WBS: 45299.1.1 TIP: B-5201 COUNTY: BEAUFORT

DESCRIPTION(1): BRIDGE NO. 33 ON E- (NC 99) OVER A CANAL

EXISTING BRIDGE

Information from:

Field Inspection \_\_\_\_\_ X \_\_\_\_\_ Microfilm \_\_\_\_\_ (reel \_\_\_\_\_ pos: \_\_\_\_\_ )  
Other (explain) \_\_\_\_\_

Bridge No.: 33 Length: 36' Total Bents: 5 Bents in Channel: 3 Bents in Floodplain: 2  
Foundation Type: TIMBER PILES

## EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE NOTED

Interior Bents: NONE NOTED

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

## EXISTING SCOUR PROTECTION

Type(3): WOODEN END WALLS AND WOODEN WING WALLS

Extent(4): 10 FEET OUTSIDE BRIDGE

Effectiveness(5): EFFECTIVE

Obstructions(6): FALLEN TREES AND DEBRIS UPSTREAM IN CHANNEL

## INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This

elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodibility of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

## DESIGN INFORMATION

Channel Bed Material(7): SAND

Channel Bank Material(8): SAND

Channel Bank Cover(9): TREES AND SHRUBS

Floodplain Width(10): APPROX. 500'+

Floodplain Cover(11): TREES AND SHRUBS

Stream is(12):	Aggrading	Degrading	X	Static
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Channel Migration Tendency(13): NONE - CHANNELIZED

Observations and Other Comments:

## DESIGN SCOUR ELEVATIONS (14)

Feet X Meters

## MENTS

Comparison of DSE to Hydraulics Unit theoretical scour.  
Design Scour Elevations agree with the Hydraulic Units 100-yr contraction scour elevations proposed in the Hydraulics report dated September 21, 2010.

# SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank							
Sample No.							
Retained #4							
Passed #10							
Passed #40							
Passed #200							
Coarse Sand							
Fine Sand							
Silt							
Clay							
LL							
PI							
AASHTO							
Station							
Offset							
Depth							

Template Revised 02/07/06

Reported by:

1/2  
Tyler Bottoms

Date: 11/29/2010